

MEETING THE CHALLENGE OF CLIMATE CHANGE

*A status report
on
initiatives in Ontario to reduce greenhouse gas emissions*

*Prepared for the
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and the
Council of Energy Ministers*

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MINISTRY OF ENVIRONMENT AND ENERGY

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MEETING THE CHALLENGE OF CLIMATE CHANGE

A Status Report on Initiatives in Ontario to reduce greenhouse gas emissions

Highlights

- ◆ Many of the strategic directions recommended in the National Action Program have been pursued in Ontario. The province has traditionally shown leadership in energy efficiency -- an area key to reducing greenhouse gas emissions.
- ◆ Ontario will build on the province's past leadership in energy efficiency and pollution prevention to support climate change objectives. For example, energy efficiency will be enhanced through broadened coverage of products under the *Energy Efficiency Act* and through activities in the Green Communities program. Emissions in the transportation sector will be reduced by investments in public transit, vehicle inspection and maintenance, and through government/industry partnerships on cleaner vehicles and fuels. Environmental guidelines are being considered for the management of landfill gas.
- ◆ The Ontario government continues to be a strong supporter of the Voluntary Challenge and Registry Program -- an important component of the National Action Program. The government believes that Ontario industries will respond to the Voluntary Challenge with innovative action plans, tailored to their specific operations that will enable emission reductions in cost-effective ways. Many Ontario-based companies, and municipal and regional governments, already have developed action plans or have registered commitments with the Voluntary Challenge.
- ◆ The Ontario Ministry of Environment and Energy intends to register an Action Plan under the Voluntary Challenge for improved energy management in government operations.
- ◆ Clearly, more work is needed as the province seeks to meet its responsibilities by adopting a precautionary approach to climate change. In assessing further options, the province will look for cross-cutting solutions that help address multiple objectives beyond reduced greenhouse gas emissions, such as reduced ground level ozone, improved energy savings, or sustainable development.

- ◆ The province is continuing to study the options to identify further cost-effective opportunities for building upon current initiatives. Studies have been commissioned to provide guidance on future actions, as the province looks for opportunities to achieve sustainable, long-term reductions in greenhouse gas emissions.
- ◆ Long-term solutions are required to address this long-term problem. The province is looking for cost-effective actions that will result in sustainable improvements in emission levels for many years to come, avoiding costly "quick fixes". Some actions will be possible over the short-term. Others will require a gradual modification of behaviour and consumption patterns over time.
- ◆ The government is seeking cost-effective measures that achieve environmental benefits without impacting adversely on the industrial base or economic growth. The emphasis will be on solutions that are consistent with the fiscal and economic realities of the province, and the need to maintain the international competitiveness of Ontario's industries. Opportunities for positive economic spinoffs to industry and job creation will be sought.
- ◆ Climate change is a shared responsibility. There are roles for both public and private sector actions to reduce emissions. Ontario looks forward to working in partnership with other federal, provincial and territorial governments. The province supports federal leadership toward this national goal, and encourages the federal government to actively pursue opportunities for harmonizing policies and measures with the United States and other developed countries that will facilitate greater global emission reductions, without impacting adversely on Canada's industrial competitiveness.
- ◆ Managing climate change will involve an evolutionary process, reassessing progress and introducing new approaches as required. Existing initiatives provide a solid basis upon which further actions may be expanded or developed.
- ◆ The policies and programs in place today, the actions planned and the studies in progress together will provide a framework upon which further actions may be introduced as all sectors in the provincial economy work toward the national climate change objectives.

I. INTRODUCTION

Canada has made a commitment to address the environmental threat posed by climate change. Meeting this difficult challenge will require a wide range of initiatives by all levels of government, the private sector and individual Canadians to help control and reduce emissions of greenhouse gases.

Ontario is committed to assisting Canada meet the national climate change objectives. This status report outlines activities in Ontario that will help manage greenhouse gas emissions. The policies and programs in place today, the actions planned, and the studies in progress together provide a framework upon which further actions will be introduced, as all sectors of the province continue to work toward the national target for climate change.

The Global Challenge

Following the 1992 Earth Summit meetings in Rio de Janeiro, Canada and over 150 other countries signed the United Nations *Framework Convention on Climate Change*, which commits signatories from industrial countries to stabilize greenhouse gas emissions at 1990 levels by the year 2000.

In the past 200 years, atmospheric concentrations of carbon dioxide -- the principal greenhouse gas -- climbed by some 25 percent, and the rate of increase is accelerating. If this trend is not reversed, atmospheric carbon dioxide is expected to double within the next century.

The Intergovernmental Panel on Climate Change (IPCC), an expert panel of some 2,500 scientists from around the world, is attempting to model changes in the global temperatures, precipitation and wind patterns that will result as greenhouse gases accumulate in the atmosphere. The IPCC models suggest that we may experience an increase of 0.8°C to 3.5°C in global temperatures by the year 2100.

If climate change occurs to the extent predicted by the scientific models, it will pose significant risks to the environment. This could result in the shrinking of the polar ice caps, severe storms, and serious disruptions in world climate patterns. Sea levels may rise, causing flooding problems for coastal communities. The ecosystems that support our forests and farmlands would be fundamentally and irreversibly altered.

Scientific models cannot, however, predict with certainty the magnitude, the timing, the regional impacts, the risks or the economic impacts associated with climate change. This remaining uncertainty supports a degree of flexibility in developing mitigative responses.

Canada's Response

Federal, provincial and territorial energy and environment ministers have agreed to work together to help meet the national objective of stabilizing greenhouse gas emissions at 1990 levels by the year 2000. Options also are being considered to address emissions beyond the year 2000.

Without further actions taken, the most recent federal forecast predicts that Canada's greenhouse gas emissions will be 13 percent higher in the year 2000 than they were a decade earlier, in 1990. Energy and environment ministers across Canada have forged a National Action Program on Climate Change, designed to guide efforts to manage greenhouse gas emissions.

The National Action Program sets out a framework of opportunities that jurisdictions across Canada might pursue to reduce greenhouse gas emissions. Canada's National Action Program was tabled in Berlin in April 1995 at the first Conference of the Parties to the United Nations *Framework Convention on Climate Change*. The National Action Program will be subject to a formal review process in 1996, with the results provided to the Conference of the Parties in Spring 1997.

The National Action Program is founded on a number of principles. The plan advocates a precautionary approach for taking action, recognizing remaining uncertainties in the scientific projections for climate change. It emphasizes shared responsibility by all sectors, and encourages cost-effective responses which will not conflict with economic priorities and competitiveness. Canada's plan is presented as a "living program", which is in the early stages of development and which will be further expanded over time as experience is gained, and scientific and economic understanding enhanced.

Climate Change Impacts in Ontario

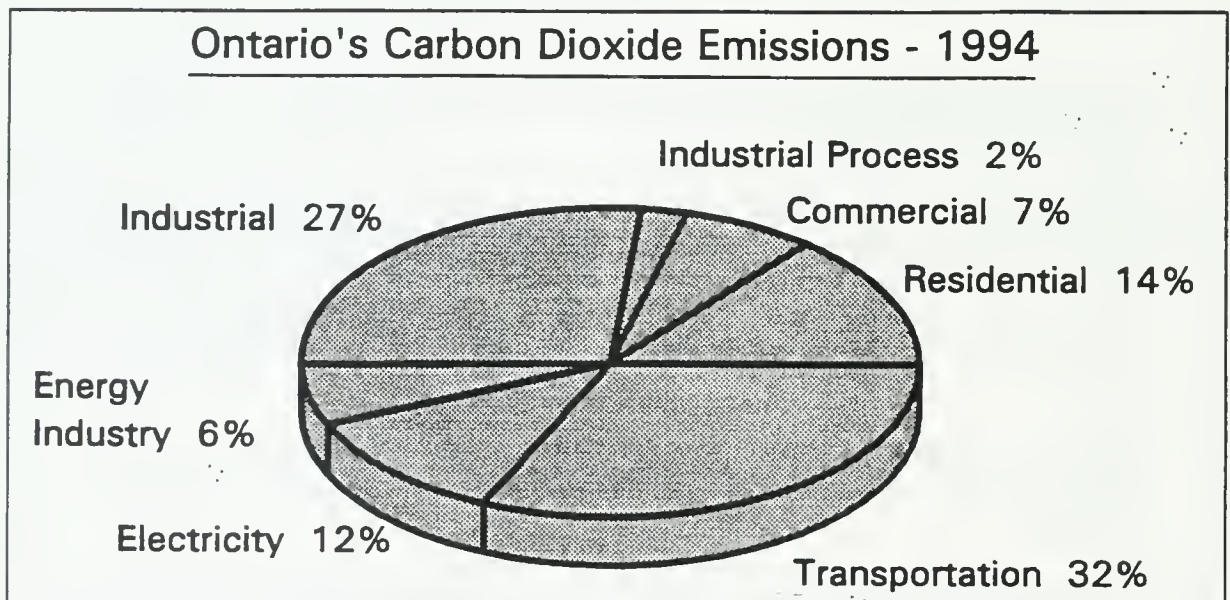
A recent study prepared for the Ontario Round Table on Environment and Economy identified risks to Ontario that may arise in the event of a doubling of global carbon dioxide. Some of the potential impacts include:

- ◆ Great Lakes water levels may decline 0.5-2.5 metres and fall to or below historic lows, hampering commercial shipping, increasing dredging, reducing water supply and hydroelectric power generation, and impairing water-based recreation activities.
- ◆ Reductions in water supply and heightened demand for water have implications for apportionment of water, and proposals for diversions within and outside the Great Lakes basin, and binational water management agreements.
- ◆ Increased potential for peak energy demand during the summer months as a result of higher temperatures will need to be considered in future energy planning.
- ◆ Costly improvements to wastewater treatment facilities may be needed if the waters are less able to assimilate waste, due to low streamflows and higher water temperatures.
- ◆ Wheat, soybean, barley and corn production could decrease by 12 - 58%; the frequency and severity of agricultural drought would be expected to increase.
- ◆ Distribution and areal extent of inland wetlands and enclosed wetlands along the Great Lakes shoreline could decrease due to water supply changes and other factors.
- ◆ Impaired water quality will lessen fish health, survival and productivity. Cool water fish species could be replaced by approximately 30 new warm water species.
- ◆ Forest-based industries and resource towns may have to adjust to a northward shift of boreal forests; hardwood species may dominate. The frequency and severity of forest fires may rise.
- ◆ The direct impacts of climate change on human health are expected to include a rise in mortality due to heat stress. Heat stress risks caused by "heat waves" similar to those experienced in Ontario during the 1995 summer likely will recur.
- ◆ Increased respiratory and cardiovascular diseases may arise from air pollution and infectious diseases, such as the potential spread of Lyme disease and malaria.

II. SOURCES OF GREENHOUSE GASES

Ontario, as the manufacturing centre of the country and the base for one-third of the country's population, produces about one-third of Canada's energy-related carbon dioxide emissions. Ontario is the largest source of greenhouse gases in the country. In per capita terms, Ontario ranked seventh among the provinces in terms of energy-related carbon dioxide emissions in 1990, 14.5% below the national average.

Cold Ontario winters and hot summers translate into substantial requirements for heating and cooling, and reliance on fossil-fuelled powerplants, furnaces and boilers, which emit greenhouse gases. Transportation needs are great in Ontario, where a commuter culture and the distances between regional centres translate into millions of cars, trucks, trains and airplanes, all generating greenhouse gases. And an economy made strong by resource extraction and processing requires smelters, paper mills, steel plants -- all of which use energy and emit greenhouse gases.



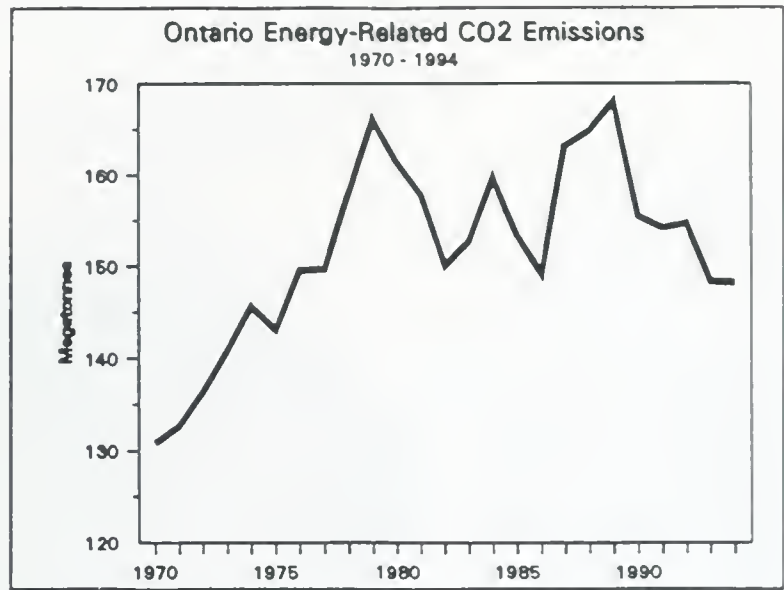
After peaking in 1989, Ontario's greenhouse gas emissions declined for several years as conservation efforts reduced energy use, economic conditions slowed development and the province made greater use of nuclear-generated electricity.

In 1990, Ontario consumed approximately 3,686 petajoules (PJ) of primary energy, releasing 155 million tonnes of carbon dioxide. In 1994, when primary energy consumption rose to 3,874 PJ, up 5.1% from 1990, carbon dioxide emissions were 148 million tonnes, 4.5% below the 1990 level.

Under current forecasts of economic activity and population growth, Ontario's greenhouse gas emissions are forecast to rise as we approach the year 2000. The last federal forecast for Ontario's emissions in the year 2000 suggested that, without further actions taken, Ontario's greenhouse gas emissions could be approximately 9% above 1990 levels by the year 2000.

Without the initiatives underway in Ontario today, the forecast emissions gap would have been much more serious as we look ahead to the year 2000. The estimated 9% gap would be roughly double without the actions currently in place.

The national review of Canada's progress on greenhouse gas emissions, scheduled for 1996, will provide better information as to how existing and planned measures will help address the gap further.



The Greenhouse Gases

Carbon Dioxide (CO₂)

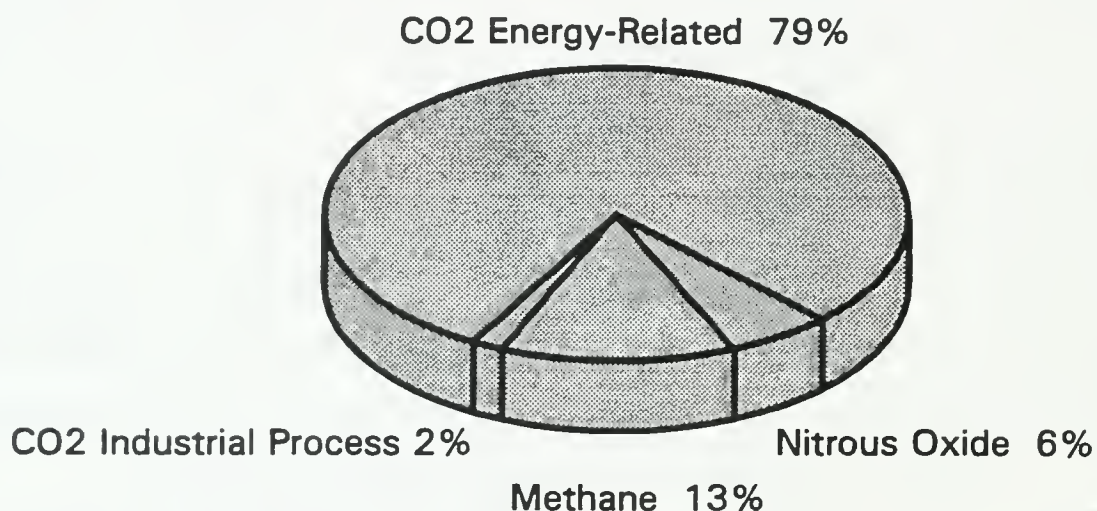
Carbon dioxide accounts for some 81% of Ontario's greenhouse gases. This gas is produced primarily through the combustion of organic fuels, such as wood, coal, oil and natural gas, and is also released as an inherent part of some industrial processes.

Methane (CH₄)

Until recently, the global warming potential of methane had been underestimated by the international scientific community. While accounting for a smaller share of global greenhouse gases, methane has a global warming potential 21 times that of carbon dioxide over a 100 year period, making it a very serious greenhouse gas. Methane is produced by the digestion or decay of organic matter in the absence of oxygen. Landfills, marshes and swamps, and the stomachs of cows, generate methane gas. Methane also escapes during the processing and shipment of natural gas. In Ontario, anthropogenic methane accounts for an estimated 13% of the province's greenhouse gas emissions, on a carbon dioxide equivalent basis.

Ontario's Greenhouse Gases - 1994

Excludes CFC's and Ozone
CO2 Equivalent



100 year global warming potential for N₂O: 310

100 year global warming potential for CH₄: 21

Nitrous Oxide (N₂O)

Nitrous oxide is produced by the burning of fuel and the extensive use of fertilizers. Nitrous oxide is a potent greenhouse gas, with a global warming potential 310 times that of carbon dioxide over a 100 year period. It accounts for 6% of Ontario's greenhouse gas emissions on a carbon dioxide equivalent basis.

Other Greenhouse Gases

Other greenhouse gases include chlorofluorocarbons (CFCs) and ozone. CFCs are synthetic compounds once commonly used as refrigerants, cleaning solvents, aerosol propellants and in the manufacture of plastic foam. Use of CFCs is being phased out under the Montreal Protocol, introduced to safeguard the planet's ozone layer.

Ground-level ozone, a prime component of smog, is formed when sunlight acts upon the volatile organic compounds (VOCs) and nitrogen oxides (NO_x) emitted primarily by cars and industry. As well as being a serious pollutant, ozone is a greenhouse gas.

III. MANAGING GREENHOUSE GAS EMISSIONS IN ONTARIO

Ontario's Commitment

In support of the national objective of stabilizing greenhouse gas emissions at 1990 levels by the year 2000, the Ontario Ministry of Environment and Energy has actively assisted with the development of a National Action Program. Ontario will continue to work with other public and private sector stakeholders in addressing climate change.

While uncertainty remains as to the extent and momentum of projected global climate change, the risks of inaction are too high to adopt a "wait and see" approach. Reducing the emissions of greenhouse gases will reduce the risk of climate change and soften the environmental repercussions. The Ontario government supports taking a precautionary approach to managing greenhouse gas emissions through cost-effective measures and actions that are justified for meeting other environmental or economic objectives, such as energy efficiency or resource conservation.

Many of the directions set out in the National Action Program have already been initiated in Ontario. For example, Ontario has long been a leader in developing energy efficiency initiatives, many of which are outlined in this report, which will help reduce greenhouse gas emissions and counter the effects of climate change. Ontario encourages other jurisdictions in Canada to follow these directions. By building on these initiatives, the province will seek to assist Canada in meeting its international commitment.

Like other jurisdictions in Canada, the Ontario government is studying, developing and implementing actions which will help meet the national emission goals. The province will continue to study the options to identify further cost-effective opportunities, as guided by the principles outlined below.

Guiding Principles

A Comprehensive Approach

In the spirit of the National Action Program, Ontario is adopting a comprehensive approach to climate change. To meet the province's environmental responsibilities relating to climate change, the province will seek opportunities to address all types of greenhouse gases. Similarly, we will look for ways of managing emissions across all sectors where greenhouse gas emissions originate. All players in the economy have a role to play in shouldering some of the responsibility for addressing emissions. By positioning all to make sensible choices in the production and consumption of energy in years to come, the costs will be shared and maximum effectiveness guaranteed.

Cost-Effective Responses

The Ontario government believes that actions should focus on cost-effective solutions. Priority will be given to approaches that address multiple environmental issues, in addition to climate change, such as smog and air toxics. Cross-cutting benefits to air quality will be important considerations in assessing the options available. In addition to the environmental benefits, measures may conserve nonrenewable resources, or improve energy efficiency.

Workable solutions will be sought which are consistent with the economic and fiscal climate of the province. The Ontario government is committed to ensuring that there is a positive business climate in Ontario, that the market is the driver for a sound and safe environment, and that regulations are streamlined to allow industry to unleash its full innovative capacity. The Ontario government will continue to encourage prudent, cost-effective measures that achieve environmental benefits without adverse impacts on the province's industrial base or economic growth. Opportunities will be sought to achieve positive economic spinoffs from actions that mitigate greenhouse gas emissions.

The province's approach to greenhouse gas emission reduction must be cost-effective, fair and responsive to both environmental and fiscal priorities.

Partnerships

The Ontario government will show leadership by seeking out cost-effective solutions where government intervention makes sense. But clearly participation in all sectors must continue if progress is to be ensured. There are roles for both the public and private sectors in reducing emissions.

The Ontario Ministry of Environment and Energy is a strong supporter of the national Voluntary Challenge Program, and is encouraging all organizations to register voluntary action plans for emission reduction through this national registry. Many programs and activities are in place in the private sector, and new action plans are being developed as Ontario industries embrace the Voluntary Challenge. Environmental leadership is continuing within Ontario's municipal governments, where commitments have been made and plans are being developed to reduce greenhouse gas emissions.

A shared response is the only effective way to address the threat of climate change. Unilateral action, without similar commitments from other jurisdictions, could blunt the effectiveness of efforts and prove counterproductive. Opportunities for partnerships and coordinated efforts will be considered which would allow for maximum cost-effectiveness in managing emissions. Ontario looks forward to working closely with other governments in Canada on coordinated national initiatives, and supports federal leadership on climate change. We encourage the federal government to pursue harmonized initiatives with the United States and other countries that will facilitate greater emission reductions while

preserving Canada's industrial competitiveness.

Sustainable Solutions for the Long-Term

Long-term solutions are needed to address a long-term problem such as climate change. Ontario places a priority on cost-effective actions that will result in sustainable improvements in emission levels not just for a year or two, but for many years to come. The government is not looking for costly "quick fix" programs. Some responses will be relatively easy to introduce over the short term. Others will involve the gradual modification of behaviour and consumption patterns over time by all members of society.

Evolving Responses

Just as Canada's National Action Program is a "living plan", developing over time, Ontario's climate change responses will follow an evolutionary process, as progress is assessed and new initiatives introduced as required. The government will be guided by studies and analysis under way.

The actions reported in Section IV signal the groundwork laid and some new actions planned across Ontario.

IV. INVENTORY OF ONTARIO ACTIONS WHICH REDUCE GREENHOUSE GAS EMISSIONS

Broad-Based Activities

Study of Climate Change Options for Ontario

Analysis of climate change options is being undertaken for the Ontario government and other interested parties by the Canadian Institute for Environmental Law and Policy (CIELAP). CIELAP's study will contribute to the Government's ongoing evaluation of climate change options for the province.

The intent of the study is to help identify a pragmatic approach to addressing emissions both by the year 2000, and for the post-2000 period. Effective strategies are being studied that will permit long-term sustainable improvements in greenhouse gases. The analysis will emphasize solutions that are cost-effective and equitable, and which avoid adverse impacts on the competitiveness of Ontario's industries.

Analysis will seek to find solutions that offer multiple environmental benefits. Instruments will be assessed on their abilities to provide cross-cutting benefits beyond greenhouse gas emissions, such as reduced urban smog and acid rain.

CIELAP's study will provide detailed information on the marginal costs and benefits of adopting a range of targets and policy instruments across sectors. The Energy Research Group at Simon Fraser University will undertake the economic analysis to support the CIELAP project. The Energy Research Group will be estimating the costs of climate change strategies.

An "intra-sectoral technology use model" will be used to assess options for the following sectors: residential, commercial, pulp and paper, mining, industrial minerals, chemical products, metal smelting, refining, petroleum refining and other manufacturing. The Energy Research Group will evaluate the incremental costs and rate impacts of various levels of carbon dioxide emission constraints on the electricity sector. They also will apply models to evaluate the emissions impact from various fuel efficiency scenarios and reductions in average vehicle miles travelled.

The study draws on a multi-stakeholder process involving industry, environmental groups, consumer and labour groups and governments, to provide direction to the study and facilitate further discussion around the most effective ways of achieving our climate change objectives. The analysis is scheduled for completion in early 1996.

Communicating Climate Change

The long-term challenge to the environment posed by climate change means that innovative ways must be sought to limit the growth in greenhouse gas emissions. In some areas, this may require fundamental changes in the way we produce and consume energy. To better acquaint the general public with the issue of climate change, the Ontario government will be developing new materials that will broaden understanding of the issues involved and the challenges we face.

Voluntary Challenge Program and Registry

The Ontario government has been assisting in the development of the national Voluntary Challenge Program and Registry -- an important component of the National Action Program on Climate Change.

The Voluntary Challenge Program will provide a vehicle through which Ontario's organizations may signal their commitment to reducing greenhouse gas emissions voluntarily. The program will ensure flexibility to organizations, who can tailor action plans as most appropriate for their respective lines of business and circumstances. These commitments and the planned industry actions will be recorded in the national Registry.

A significant number of Ontario-based companies already have indicated commitments to voluntary actions to address greenhouse gas emissions. Some formal Action Plans have been submitted to the Program. Indications to date appear promising, with support for the Voluntary Challenge Program coming from both the energy-producing sector -- electricity generation, gas pipelines and petroleum refiners -- and also the energy-using sectors, including pulp and paper, cement and chemical industries, mining, and manufacturing.

The Ontario government encourages all sectors to come forward to demonstrate that significant progress will be made voluntarily in support of Canada's climate change objectives.

Sector-Specific Activities

Ontario Government Energy Management: Getting Our House in Order

Ontario recognizes that efforts by all sectors of society will be essential in managing greenhouse gas emissions. Governments have a responsibility to show leadership by addressing emissions within government operations. The Ontario Ministry of Environment and Energy intends to register a climate change Action Plan with the Voluntary Challenge and Registry Program. The Action Plan will build upon the initiatives currently in place to both improve energy management in Ontario's public sector operations, and realize cost savings in government operating budgets. Existing initiatives, outlined below, will be reviewed to identify opportunities for further reducing greenhouse gas emissions from Ontario government operations.

The Ontario Realty Corporation currently is working with government ministries to implement action plans to improve energy efficiency in government-owned and operated buildings by 20 percent over 1990 levels by the year 2000, with a corresponding annual reduction of over 200 kilotonnes of carbon dioxide emissions. These targets will supplement the 40 percent improvement achieved between 1975 and 1990.

Through the **Government Energy Management Program**, government ministries are offered, on a case-by-case basis, assistance in:

- auditing and monitoring the implications of energy use patterns;
- identifying cost savings, developing action plans, implementing new energy accounting systems and retrofitting existing buildings (including the demonstration of innovative design practices or technology); and
- providing energy management training for building operators and maintenance personnel.

A \$60 million fund is intended for investment in energy efficiency in provincial buildings over the next five years, with potential for savings of \$12 million per year. To minimize financial requirements for the government, the province has also looked to approaches other than self-financing to meet the capital requirements of energy efficiency initiatives. Arrangements such as financing by energy service companies and private sector leasing allow the government to implement projects without straining government financial resources, and to proceed on a wider scale.

The Ontario government has in place the most comprehensive environmental building assessment system in the world. The **Building Environmental Performance Assessment**

Criteria (BEPAC) system will evaluate the environmental merits of office buildings, beginning with pilot projects in Ontario government facilities. BEPAC is a voluntary program that encourages building owners, managers and tenants to introduce more environmentally responsible practices and higher performance standards. It addresses ozone layer protection, impacts of energy use, indoor environmental air quality, resource conservation and transportation issues. The program provides a comprehensive and objective measurement system that allows design professionals, facility managers and tenants to work together to create "green" buildings.

The Ontario government owns and operates a **fleet** of over 11,000 police and passenger cars, vans and trucks, snowploughs, ambulances and other vehicles. In total, these vehicles travel more than 250 million kilometres and consume over 50 million litres of fuel each year. Government ministries seek to minimize fuel use and expense through such measures as regular maintenance, driver education and training, the purchase of smaller cars, reduced use of vehicles, and sound record-keeping.

The Ontario Ministry of Transportation has been active in promoting and implementing **car and van pool programs** throughout government and private sector companies since 1978. Most recently, in 1993, a Partners Group comprised of the provincial ministries of Environment and Energy, and of Transportation, and the Green Workplace of Management Board along with Environment Canada and Natural Resources Canada, was formed to develop an automated Voice Response System (VRS) for self registration and matching of potential car poolers. The system was implemented for all federal and provincial employees in Metro, and all federal employees in Ottawa. In April 1995, a cooperative demonstration project with the Town of Markham's Green Community Project was launched to promote the new system to all Markham households. The VRS is fully operational and proven, and the Markham project is being monitored for expansion to other communities.

The government continues to examine opportunities to make greater use of cost-effective renewable energy systems in its operations, and has demonstrated photovoltaic systems in applications such as security lighting, and radio repeater stations in remote locations.

Municipal Government Activities

The two largest municipal governments in Ontario -- Toronto and Ottawa -- and the largest regional government -- Metro Toronto -- have made commitments to reduce emissions by 20% from 1988 baseline levels by the year 2005. The leadership shown by these local governments will make important contributions to addressing greenhouse gas emissions in Ontario.

These urban centres are significant sources of greenhouse gases. Together, these centres account for about one-third of Ontario's population and a corresponding share of greenhouse gas emissions. Actions taken by these governments can have considerable impacts on emission levels.

Climate Change Plans

In January, 1990, the City of Toronto declared an official commitment to the 20% reduction of the 1988 levels of carbon dioxide emissions into the atmosphere within the City of Toronto by the year 2005. In July, 1990, Toronto City Council approved the establishment of the Energy Efficiency Office with a mandate to develop and implement a comprehensive energy efficiency and conservation strategy for the City of Toronto. The Energy Efficiency Office, located within the Department of Public Works and the Environment, works towards the following major objectives:

1. to promote and pursue energy efficiency and conservation practices in all City-owned buildings;
 2. to promote and pursue energy efficiency and conservation practices in new construction by the City or by others; and
 3. to promote the use of energy efficient methods and practices in existing buildings, by facilitating the implementation of energy efficient retrofits by the public and private sectors.
- Some of the programs and initiatives that have been undertaken to date to assist the City in meeting its official carbon dioxide emissions reduction target include:
 - a comprehensive retrofit for City-owned buildings;
 - Street and Lane Lighting Conversion Program;
 - Energy Efficiency and Conservation Plans (a requirement for energy efficiency and conservation plans in new developments, preceding the introduction of the ASHRAE 90.1 standard into the Ontario Building Code);
 - participation in a wide range of studies and planning exercises with the major local utilities and other stakeholders and partners;

- development and dissemination of information on energy efficiency; and
 - development of a City-wide database to track carbon dioxide emissions reductions from all stationary sources within the City of Toronto.
- A major initiative currently underway is the Energy and Water Efficiency Pilot Programme. This \$30 million Pilot Program will involve the comprehensive retrofit of small, medium and large buildings in both the public and private sectors and will focus on the multi-unit residential, commercial, institutional and industrial sectors. The retrofits will include short and long-term payback measures and will form part of an attractive overall energy and water efficiency package to building owners and tenants. The two-year pilot program is expected to be followed by the implementation of a City-wide program.

The **City of Ottawa** announced the Action Plan of the Task Force on the Atmosphere in October, 1995. It consists of initiatives in three areas - residential buildings, commercial buildings, and the transportation sector - and a monitoring program. The initiatives include:

- For residential buildings
 - an information and referral service to provide a central location for information and expertise on energy efficiency design, construction and retrofits;
 - a pilot home energy rating system;
 - work toward favourable financing for energy efficiency retrofits through financial institutions;
 - develop and improve contractor certification;
- For commercial buildings
 - Ottawa's carbon dioxide Corporate Challenge, designed to operate in parallel with the national Voluntary Challenge;
 - provide Federal Buildings Initiative information;
 - working group to expand the role of energy service companies by developing initiatives to encourage their use;
- In the transportation sector
 - transportation awareness program on the relationship between vehicle emissions, local air quality, greenhouse gas emissions and health impacts;
 - employer-based demand management program distributed through the Corporate Challenge;
 - alternative fuels demonstration program to develop data on feasibility and inform fleet managers of the wide range of alternatives available.

In May 1991, **Metro Toronto** adopted a Strategic Plan that guides Metro initiatives to achieve environmentally sustainable development, social equity and economic vitality. Arising out of the Strategic Plan, Metro Toronto adopted the Metro Urban Carbon Dioxide Reduction Strategy in 1993, with the target to reduce carbon dioxide emissions associated with energy use within the Metropolitan Toronto area by 20% below 1988 levels by the year 2005. This target is confirmed in resolutions of Council and in the new Metro Official Plan. Some of the actions taken in Metro which help reduce greenhouse gas emissions are outlined below.

- Methane recovery at landfills and sewage treatment plants. Landfill gas is recovered and used to generate electricity at two major landfill sites in Metro. Methane is recovered at the main sewage treatment plant and used for heating in the treatment process.
- Measures to support land use intensification, including a revised Official Plan incorporating policies supporting environmental improvement, such as higher density development around subway stations, and targets for housing unit construction to increase overall population density.
- Evaluation of Metro fleet vehicles in the pilot vehicle emissions inspection and maintenance program, leading to improved fuel efficiency.
- Support for more efficient transportation modes, including:
 - Continuing improvements to surface transit operations to shorten travel times. Recent projects include providing traffic signal priority for transit vehicles in mixed traffic. Street car preemption of traffic signals is in place on a number of street car routes.
 - In 1994 and 1995 about 54 kilometres of roads were re-stripped to provide wider curb lanes suited to bicycle use. Separate bicycle lanes have been provided on key bridges; and
 - Introduction of 65 kilometres of high occupancy vehicle lanes by Metro Transportation, and the expansion of lanes reserved for buses to 19 kilometres.
- Optimization of the water distribution system to improve energy efficiency, through measures such as higher efficiency motors and variable speed drives, and introduction of demand management to reduce water use.
- Distribution of retrofit kits under the Metro water efficiency program - over 17,000 have been distributed to date, with estimated annual savings of \$2 million for users.
- Operation of an extensive recycling system that helps conserve the energy in manufactured products. In 1994 the Metro Blue Box program saved the

equivalent of 10 million litres of gasoline through the recycling of aluminum cans. The Metro Blue Box program has recently been expanded to include more paper and aluminum products.

- Investigation of district energy and cogeneration system opportunities and participation in future energy demand and supply planning. Metro Toronto has reviewed energy flows and use in Metro and concluded that there is substantial potential to make use of currently wasted energy. Metro is pursuing this further with stakeholders.

Municipal Retrofits

The Ontario government is working with the International Council for Local Environmental Initiatives (ICLEI) on a co-operative municipal energy improvement program. The municipal program is designed to create jobs and reduce energy consumption and costs in a period of financial constraint.

ICLEI is establishing a pilot municipal energy improvement facility and will provide brokering and consulting services to municipalities on energy retrofits. Additional support for the three-year, demonstration phase of the project is being provided by Ontario Hydro and Consumers Gas. Ultimately, the project is expected to spur up to \$100-million in municipal retrofits.

Commercial and Residential Energy Efficiency

There are a broad range of initiatives being undertaken individually by consumers, home builders, manufacturers, landlords, tenants and home owners in Ontario to reduce energy use associated with buildings and appliances in Ontario. Individuals and corporations have recognized the economic and environmental value of reducing energy use. To support these individual initiatives, the Ontario government has established standards on energy efficiency and programs to assist "green" initiatives.

Energy Efficiency Act (EEA) Standards

A regulation under Ontario's **Energy Efficiency Act** prescribes minimum efficiency standards for goods sold or leased within the province. Under the provincial Act, passed in June 1988, the government can require that specified residential, industrial and commercial equipment manufactured for lease or sale in Ontario meet minimum energy efficiency standards and bear the specified verification label. Such standards are developed by nationally recognized standard writing organizations, such as the Canadian Standards Association, Underwriters' Laboratories of Canada, and the Canadian Gas Association. The multi-stakeholder, consensus-based process uses technical committees comprising of government, business, industry, consumer and other interest representatives.

Since its introduction in 1988, coverage under the Act has been extended to 40 categories of appliances or equipment. Ontario is continuing to expand the coverage of appliances and regulations under the Act and to encourage the use of high-efficiency products.

More stringent regulations for equipment already regulated, and broader coverage of products, is planned over the next few years. An additional 18 standards are currently under development. Some products for which standards are being developed include commercial refrigeration equipment, fractional horsepower motors, commercial gas water heaters, exit signs, gas fireplaces, gas clothes dryers, fluorescent lamps, hot and cold food vending machines, windows, doors, gas room heaters, gas wall furnaces, and pool heaters. These enhanced and new standards are expected to reduce carbon dioxide emissions by over 3,000 kilotonnes per year by 2000.

Green Communities

Ontario's "Green Communities" initiative helps communities to increase energy and water efficiency, reduce waste and prevent pollution in all sectors -- residential, small business, institutional and educational -- as well as in transportation. The program provides guidance and funding for development and implementation of projects such as home audits, analysis and training programs in the institutional and small business sectors, educational activities in schools, and transportation and green space programs. Partnerships with municipalities, utilities, the private sector, financial institutions, environmental and other community groups and labour are key components of the initiative. Low-cost financing is available from several financial institutions for home improvements. Most communities have opened centres in prominent locations to provide the community with information on green products and technologies.

Participating communities set their own goals and choose their own initiatives, leading to self-sustaining activities that continue beyond the initial period of government involvement. With financial and technical assistance provided by the Ministry of Environment and Energy, the Green Communities initiative allows participating communities to set their own energy efficiency and resource conservation goals in the residential, commercial, industrial, institutional and transportation sectors. A community-based program, directed by a multi-stakeholder steering committee, can take greater advantage of local municipal, non-governmental and private sector partnerships and support. Activities may include home, school and commercial energy audits, auto tune-up clinics, store-front information and help centres, alternative fuel vehicles, and solar power demonstrations.

Launched in 1991 as the Energy Efficiency Communities Program with pilot projects in three municipalities, the initiative has evolved and expanded to encompass waste reduction, energy efficiency and water conservation. Currently, 19 Ontario communities are participating. Results to date show water savings of 20%-30%, energy savings of 10%-15%, and waste reduction of 30%.

Home "green-up" visits are a major component of the initiative. Specially trained staff help residents assess their options for cutting energy, water use and waste. They may supply and help install conservation devices, seal leaks and provide access to low-interest financing for more ambitious projects. The householder may also be directed to local contractors, retailers or product manufacturers.

Approximately 150,000 homes are expected to be visited over the next three years in over 25 communities by April 1997. The home green-up component alone is expected to result in homeowners cutting energy use 10 to 15 percent. By the year 2000, this would translate into significant savings of natural gas, oil and electricity, and corresponding reductions in greenhouse gas emissions.

Ontario Building Code

The energy efficiency provisions in the Ontario Building Code (OBC) for the construction of new buildings have been upgraded in several stages.

Amendments to the OBC, introduced in 1990 and 1993, set higher insulation standards for new housing. The higher energy efficiency standards for electrically heated homes approach those of the R-2000 standard. Ontario's renovation provisions make the OBC the first building code in Canada to also address the renovation of existing buildings.

In addition, the comprehensive ASHRAE/IES 90.1 standard, applicable to new commercial and highrise apartment buildings, is now referenced as "good engineering practice" in the OBC. ASHRAE/IES 90.1 addresses the building shell, lighting and mechanical equipment. The Ontario Building Code requires that commercial and highrise apartment buildings be built to good engineering practice. The reference to the ASHRAE/IES standard allows municipalities in Ontario to require compliance with the standard.

The National Energy Code for Buildings, developed by the National Research Council, is largely based on the ASHRAE/IES 90.1 standard currently referenced by the OBC. Similarly, the Ontario regional requirements proposed under the NRC's National Energy Code for Houses are similar to the existing OBC energy requirements for houses.

The Ministry of Municipal Affairs and Housing has placed a moratorium on additional changes to the OBC until 1996. The next edition of the OBC is expected to be introduced in 1997. Ontario is currently reviewing the National Energy Codes for Houses and Buildings, and will adopt these codes if they meet Ontario's requirements.

The Ministry of Municipal Affairs and Housing is working to generate private funds (energy service companies, pensions, immigrant investor) to convert industrial or commercial buildings to residential uses. In addition, the Ministry of Municipal Affairs and Housing will work with industry and other stakeholders to eliminate any impediments in the OBC to the use of recycled content materials that meet the performance levels required by the Code. The reuse of building material and the use of recycled materials for buildings conserves the energy embodied in the original manufacture of these materials.

Ontario's energy efficiency standards for new buildings are among the highest in the world. Carbon dioxide emissions savings from the higher standards are estimated to be more than 1,200 kilotonnes a year after 2000.

"Build Green Inc."

The Greater Toronto Home Builders Association and ORTECH Corporation have jointly established "Build Green Inc." which will label recycled content building materials which comply with applicable building regulations. Build Green Inc. distributes a list of products that qualify for the Build Green label.

Plumbing Code Amendments

Water conservation programs can lower consumption by 40 percent, cut the amount of energy needed to heat water, and extend the use of the existing water and sewage treatment infrastructure without expanding the capacity. Amendments made to the Plumbing Code, now part of the Ontario Building Code, will help reduce the demand for hot and cold water in commercial and residential buildings by setting maximum flow rates for showerheads, toilets and faucets. The changes also mandate the use of water efficient fixtures, such as 6 litre toilets, which will be required as of 1996.

Industrial Sector

Ontario's industries have been making important contributions to the province's environmental objectives. Improvements in energy efficiency have helped contain greenhouse gas emissions. The Canadian Industry Program for Energy Conservation (CIPEC) notes that while overall greenhouse gas emissions rose in Canada between 1990 and 1994, emissions in the industrial sector fell by 1.5%, due to improvements in energy efficiency. Further commitments are being made through the Voluntary Challenge Program. The Ministry of Environment and Energy seeks to support the industrial sector in their efforts.

Ministry of Environment & Energy Industry Programs

The Ministry of Environment and Energy will continue to use its funding strategically to reinforce key industry initiatives to enhance their environmental performance, and to encourage markets for technologies and clean production processes which reduce water, materials and energy usage. Reduced greenhouse gas emissions flow directly from reduced energy use.

The Ministry will continue to facilitate the flow of information to industry about best environmental practice and benchmarking in key industrial sectors. The dissemination of sector guidelines will assist industries in achieving their energy efficiency improvements. The Ministry will also stimulate the development of environmental technologies for small and medium-sized companies, to increase the market for waste materials.

Ontario's Green Industry Strategy

Ontario's green industry sector plays a key role in maintaining and improving environmental quality. It has become a world leader in finding solutions to environmental challenges with innovative technologies and processes.

Ontario's green industry strategy, through the Green Industry Office of the Ministry of Environment and Energy, is helping companies in this sector work together to build domestic markets and increase exports.

The Green Industry Office assists these firms in three main areas: technology development, business development and trade promotion.

Working closely with the Canadian Environmental Industry Association (CEIA) and the Ontario Centre for Environmental Technology Advancement (OCETA), two of its key private sector partners, the Green Industry Office concentrates on activities which help

firms gain competitive advantage domestically and abroad. Current objectives of the Green Industry Office include promoting strategic green procurement, expanding supplier development, monitoring local venture capital pools, facilitating links for Ontario firms with international funds for projects outside Canada, co-sponsoring workshops on accessing key markets and organizing trade missions of Ontario firms to international target markets.

Energy Production and Supply

The energy sector in Ontario has an important role to play in addressing climate change. Energy related carbon dioxide emissions accounted for 79% of Ontario's greenhouse gas emissions in 1994. The natural gas utilities and Ontario Hydro are central to Ontario's efforts on climate change, and were among the first to respond to the Voluntary Challenge Program. The major oil companies have been active participants in the development of the National Action Program and have registered Action Plans with the Voluntary Challenge and Registry Program. Independent power producers have been leading the way with new renewable energy sources and high efficiency cogeneration. The municipal electric utilities have been working with Ontario Hydro on increased energy efficiency and demand side management.

Examples of utility initiatives are outlined below.

Ontario Hydro's Greenhouse Gas Strategy

In early 1995 Ontario Hydro, the province's electric utility, announced its Strategy to Manage Greenhouse Gas Emissions. The Strategy has the objectives of:

- reducing the carbon intensity of the energy supplied by Ontario Hydro to its customers by 5% by the year 2000 compared to 1990 levels; and
- contributing to global greenhouse gas emission reduction by stabilizing Ontario Hydro's net greenhouse gas emissions at 1990 levels by the year 2000, with a further 10% reduction in emissions by the year 2005.

To achieve these objectives, programs will be pursued in the areas of:

- supply-side energy efficiency,
- end-use energy efficiency,
- renewable energy,
- greenhouse gas offsets, and
- development of market approaches.

Ontario Hydro produced an Action Plan in September 1995, detailing steps the utility will be undertaking to achieve the reduction targets set out in the Strategy. The Action Plan has been registered under the Voluntary Challenge Program. The Action Plan includes measures such as:

- developing opportunities for greater fuel conversion efficiency through cogeneration of electricity and heat energy for use in industrial processes and

district heating and cooling;

- promoting customer-driven, cost-effective, end-use energy efficiency initiatives;
- promoting energy planning processes that include externality costs;
- deploying 100 to 125 MW installed peak capacity of advanced renewable energy technologies by the year 2000;
- carrying out, before the year 2000, joint implementation and domestic offset demonstration projects which focus on the energy sector; and
- supporting the development of a North American and global carbon dioxide emissions reduction trading system.

Ontario Hydro's Renewable Energy Technologies Strategy

In November 1994, Ontario Hydro announced a comprehensive Renewable Energy Technologies Strategy and Program, with the intention to work with a range of partners and stakeholders to promote and assist the development and marketplace acceptance of advanced renewable energy technologies. The Renewable Energy Technologies Program is a five-year, \$110 million program that, by the year 2000, could see up to 125 MW added to the utility's system through such renewable sources as the wind, solar energy, and biomass. It is intended to give Ontario Hydro experience in using developing forms of renewable energy in its own operations, and set the stage for a cleaner, more cost-effective future.

Ontario Hydro has made progress in several areas of their program. Ontario Hydro is working with remote communities and the provincial and federal governments to identify and develop renewable applications in those communities. Possibilities include electrical generation through wind power, wood and wood waste, photovoltaics and micro-hydro.

In their own operations, Ontario Hydro is identifying opportunities for renewable applications. A challenge fund has been established that covers the incremental capital cost of a renewable application for the business units, to establish demonstrations and gain working experience with renewable technologies. Installations this year include a solar wall and solar lighting in a new building in Thunder Bay, and a wind turbine to power a bubbling system in a remote location at the Nanticoke generating station.

In June 1995, Ontario Hydro invited proposals in the first phase of a bidding process for new sources of energy from emerging renewable technologies. Bidders were asked to propose projects in five different areas, listed in the table below.

In October 1995, Ontario Hydro announced the completion of a short list of candidates with whom they will be proceeding to negotiate contracts. The short-listed proposals represent a total of 54.1 MW of capacity, as shown in the following table.

Technology Category	Proposals	Total MW
Individual wind turbines (Canadianized)	11	4.2
Small wind farms	4	13.8
Wood waste, manage wood or biomass	3	22.2
Anaerobic digestion and sewage gas	4	13.7
Hybrid or other innovative technologies, including micro-hydro.	2	0.2

A separate category of medium wind farms was deferred to allow more time for site studies and preparation of proposals.

Ontario Hydro's program will help newly developed technologies for harnessing renewable energy sources become viable electricity supply options in the future.

Natural Gas Utilities

Natural gas utilities, in conjunction with other energy supply and service companies, are expected to be central players in promoting and achieving energy efficiency in the province.

Ontario's three major gas utilities - Consumers Gas, Centra Gas and Union Gas - are in the process of implementing integrated resource planning. As part of this effort, they have launched demand-side management programs to improve the efficiency of gas use by their customers in a cost-effective manner. Improved efficiency can reduce greenhouse gas emissions as well as reducing nitrogen oxides emissions and assisting in addressing ground-level ozone.

Consumer's Gas and Centra and Union Gas all have shown strong support for the national Voluntary Challenge Program, and have filed Action Plans on climate change with the Voluntary Challenge.

The **Consumers' Gas Action Plan** includes efforts to:

- reduce fugitive methane emissions from their operations, through measures such as installation of low or no-bleed instruments, and improved pipeline purging procedures;
- improve the energy efficiency of gas appliances and processes, through their own purchasing and by helping to commercialize new technologies;
- establish partnerships with community groups, other utilities and governments to promote awareness of climate change and acceptance of higher efficiency products, supplemented with financial incentives to assist customers with the purchase and installation of higher efficiency products;
- encourage fuel switching from higher emission fuels to natural gas; and
- support cogeneration projects.

The **Centra Gas and Union Gas Action Plan** includes documentation of activities on:

- emissions reductions from operations, through measures including blowdown recovery, improved compressor operations, leak prevention, detection and repair in the distribution operations, energy conservation in service centres and administration facilities, and use of natural gas vehicles in their vehicle fleets;
- programs which may improve energy conservation and efficiency for customers, through promotion, provision of efficient equipment and expertise, supportive financing and billing, support for cogeneration projects and research and development;
- Centra Gas and Union Gas efforts to offset emissions with treeplanting and support for conservation programs, and participation in the Greenhouse Emissions Management Consortium along with other energy companies in Canada; and
- Centra Gas and Union Gas support of research programs through agencies such as Gas Technology Canada and the Gas Research Institute, and participation in government and stakeholder initiatives dealing with climate change and related issues.

Transportation

Ontario is pursuing initiatives that will address emissions originating in the transportation sector, which accounts for one-third of the province's greenhouse gas emissions.

Emissions originating in the transportation sector can be addressed through supply-side measures which affect the availability of transportation options, the types of vehicles and fuels sold and the maintenance of vehicles on the road. Ontario's auto manufacturing and fuel sectors have demonstrated a willingness to work closely with government to address environmental priorities. Demand-side initiatives can influence the demand for vehicle travel and fuel usage.

Vehicle Inspection and Maintenance Program

Inspection and maintenance programs for vehicles have the potential to reduce emissions of toxic, smog-related, and greenhouse gases.

A state-of-the-art vehicle inspection centre is currently being piloted in Metropolitan Toronto. The one-year pilot program is expected to test the exhaust and evaporative emissions of approximately 25,000 cars and light trucks. Inspectors will also check that emission control equipment has not been tampered with, and provide basic information on any repairs needed. In a related move, the province has begun random testing of the diesel smoke from heavy duty trucks at Ministry of Transportation truck inspection stations.

This first phase of the program is designed to raise driver awareness, evaluate test equipment and inspection methods, and compile background information on the condition of Ontario vehicles. Testing is on a voluntary basis and provided at no cost to the owner.

This program is aimed at identifying and reducing the emissions from the estimated 30 percent of the vehicle fleet which, at any given time, is in need of repair. Experience elsewhere has shown that such repairs result in an approximate average fuel efficiency improvement of 10 percent for the repaired vehicles.

The Ontario government has started to review the results of this first phase, which will assist in developing options for an expanded inspection and maintenance program in Ontario. A program for the Greater Toronto Area alone would improve fuel efficiency enough to reduce carbon dioxide emissions by nearly 400 kilotonnes a year.

Public Transit

Ontario has an extensive transit network in place. To encourage public transit, the government of Ontario makes a significant contribution each year to the operation by municipalities of subways, buses and specialized services and to the GO Transit Commuter rail and bus system. The government's transit program supports both capital and operating expenses.

Recognizing the benefits of transit in promoting growth, protecting the environment and conserving energy, Ontario plans to continue to expand the transit network and improve its efficiency and productivity.

The expansion of the rapid transit network is one element in a comprehensive transportation strategy for accommodating the expected population growth in the Greater Toronto Area. Rapid transit (and an increasing proportion of trips by transit) can accommodate this expected growth in an environmental, social and fiscally responsible manner.

In 1995, the government reaffirmed its commitment to a sound transportation system in the Greater Toronto Area by ensuring that rapid transit will be economically sustainable in the long term. To this end, Ontario will proceed with transit projects in a phased approach. In addition the province is developing strategies for increased private/public partnership opportunities and benefit sharing to ensure that potential future projects are delivered in a fiscally responsible manner.

Ontario also has launched a transit integration initiative in the Greater Toronto Area to improve service for commuters who cross municipal boundaries. This initiative is aimed at building transit's modal share in a market segment dominated by the automobile. The Government has worked with the Greater Toronto Area municipalities to create:

- a single travel pass that can be used for "seamless" travel across contiguous transit systems;
- improved coordinated services between transit systems;
- improved Area-wide transit information services, including a new integrated transit route map and customer service telephone system.

Shifting commuters out of their cars and into transit will reduce energy consumption, the production of greenhouse gases and vehicle emissions.

Coordination of Community Transportation

The Community Transportation Office (CTO) was established by the Province within the Ministry of Transportation to promote and manage the Coordination of Community Transportation Initiative. CTO works with the Ministries of Education and Training; Health; Community and Social Services; and the former Ministry of Citizenship to identify and address provincial legislative, regulatory and policy barriers to local coordination of community transportation. CTO provides guidance and support to communities that are interested in pursuing coordination of transportation.

Through the use of spare vehicle capacity, coordination may result in an overall decrease in the number of vehicles required in a community, thereby reducing vehicle emissions. Coordination may also result in more efficient scheduling and routing of vehicles, thereby decreasing the overall amount of time vehicles are in use.

High Occupancy Vehicle Lanes

By encouraging car-pooling and ridesharing, High Occupancy Vehicle (HOV) lanes promote more efficient use of vehicles and roads, leading to reduced greenhouse gas emissions. HOV lanes are restricted to vehicles with multiple occupants, and provide a route past traffic congestion.

In the last few years the High Occupancy Vehicle (HOV) network has been extended in Metropolitan Toronto through a combination of road widening and the conversion of curb lanes on several existing six lane arterials. On Don Mills Road, widening occurred over several years between Overlea and York Mills. The widening was concluded in 1994. On the existing six lane section of Don Mills Road between York Mills and Finch, the curb lanes were converted to HOV lanes to provide a continuous HOV corridor from Overlea to Finch. On Eglinton Avenue, existing curb lanes from west of Don Mills Road to Kingston Road were converted to HOV lanes.

The Ministry of Transportation will continue to work with municipalities and regions to identify opportunities for HOV lanes. It is also developing an HOV network plan for the provincial freeway network in the Greater Toronto Area.

Fuel Tax

Ontario levies specific taxes on fuels used for transportation. Gasoline Tax is levied on gasoline, propane and all fuels used to power aircraft. The tax rate for gasoline is 14.7 cents per litre; for propane the tax rate is 4.3 cents per litre; and for aircraft fuel the tax rate is 2.7 cents per litre. Fuel tax is levied on diesel fuel used for transportation, including a reduced rate for railroad locomotive fuel. The general tax rate for diesel fuel is 14.3 cents per litre while locomotive fuel is taxed at 4.5 cents per litre.

The Ontario tax on both diesel fuel and gasoline is higher than in six other provinces and considerably higher than in any American jurisdiction. In part, this is a reflection of Ontario's use of fuel taxes as a means of reducing fuel use, with the inherent benefits of reduced emissions.

Alternative Transportation Fuels

Ontario continues to support the use of alternative fuels in light and heavy duty vehicles through fiscal incentives, research, development and demonstration. In Ontario, the commercially available alternative fuels are natural gas and propane. Ethanol is also added to some gasolines to produce ethanol blended gasolines. The automobile manufacturers now offer alternative fuel vehicles for sale in Ontario and some meet the California ultra-low vehicle emission standards.

To encourage the purchase of alternative fuelled vehicles, Ontario offers several incentives:

- Ontario offers a retail sales tax refund on vehicles which operate on natural gas, propane or electricity, including vehicles which are converted to operate on these fuels within 180 days of purchase. This is capped at \$750 for propane and \$1,000 for other fuels;
- All alternative transportation fuels except propane, including the ethanol portion of ethanol-blended gasoline, are currently exempt from fuel taxes. The tax rate of 4.3 cents per litre for propane is well below the tax rate of gasoline on an energy equivalent basis;
- Producers of ethanol from renewable feedstocks in Ontario have been granted an agreement until the year 2010 that if a tax is imposed on ethanol reducing the current 14.7 cents per litre differential with gasoline taxes, they will receive offsetting payments not to exceed the amount of the reduced tax differential.

Compressed natural gas-powered transit buses are now being used in several Ontario cities. These buses were developed and built in Ontario and approximately 85 have gone

into service since 1991 and further deliveries are planned. Compressed Natural Gas (CNG) powered prototype low-floor buses manufactured by Orion Bus are in operation in Toronto and London. The monitoring of Ontario's fleet of compressed natural gas buses continues and new developments are being evaluated. These natural gas urban buses meet the strictest urban bus emission standards.

A pilot project to develop, test, and evaluate the use of liquified natural gas powered buses in a commuter application has been initiated. The first prototype bus is in regular daily use.

Ontario also supports the research and development of alternative fuels. Working with partners, a renewable biodiesel fuel made from biomass is being evaluated. This project will assess the technical feasibility and environmental impacts of soybean-derived biodiesel in heavy duty diesel engines.

The Tax for Fuel Conservation

The graduated Tax for Fuel Conservation is based on the fuel economy of new vehicles. Buyers of less fuel efficient vehicles must pay an added tax that, depending on the model, ranges from \$75 to \$7,000 for passenger cars and \$75 to \$3,200 for sport-utility vehicles. Rebates of \$100 are offered to those who purchase the most fuel efficient cars -- those with fuel economy ratings of less than 6 litres per 100 kilometres.

Together, the tax incentives/disincentives and the prevailing economic conditions appear to be changing consumer buying habits. Between 1990 and 1992, the sales of the most fuel efficient cars tripled, while sales of the worst gas guzzlers fell from 21,200 to just 7,700. By the year 2000, the Tax for Fuel Conservation is expected to reduce annual carbon dioxide emissions by 200 kilotonnes.

Biking

Ontario policy officially recognizes the bicycle as a mode of transportation. Bicycles are to be considered in land use and transportation activities. Municipalities receive provincial funding for bicycle infrastructure on a similar basis as funding for roads and transit.

Alternative Development Standards Guideline

The Ministry of Municipal Affairs and Housing, in consultation with stakeholders, has prepared a guideline to facilitate more compact, transit and pedestrian friendly urban development. The guideline, which addresses issues such as road widths, storm drainage, and setbacks, provides alternatives to more traditional suburban sprawl.

Transit-Supportive Land Use Planning Guidelines

The Ministry of Transportation and the Ministry of Municipal Affairs and Housing have developed joint guidelines to advise municipalities on transit-supportive land use planning strategies. Published in 1992, *The Transit-Supportive Land Use Guidelines* set out a wide range of strategies applicable across regional, municipal, sub-community, neighbourhood and site levels. They suggest both policy opportunities and urban design alternatives to encourage pedestrian and transit friendly communities.

Greater Toronto Area (GTA) Transportation Plan

The Ministry of Transportation has initiated the development of a Greater Toronto Area Transportation Plan. The plan is to ensure that appropriate choices are made in transportation investments to yield optimum benefits for the community, the environment and the economy. The plan will address the requirements associated with preservation and rehabilitation of existing infrastructure, as well as opportunities for optimizing the use of existing facilities. Opportunities for selective expansion of the transportation network will also be assessed.

Transportation Demand Management

As municipalities continue to grow, the demands for expanded and improved transportation facilities will also grow. Historically the solution to this was to provide more infrastructure. However the potential for expansion of the infrastructure is limited because of fiscal, social, and environmental restraints. Transportation Demand Management (TDM) is being seen as an important strategy for accommodating future travel growth in many areas.

In spring 1995, a Greater Toronto Area TDM Strategic Planning Study was initiated to explore ways to develop a coordinated approach to TDM in the municipalities of the Greater Toronto Area. A Steering Committee of the Ministry of Transportation and municipalities in the Greater Toronto Area was formed for this purpose. A draft report was produced and the committee will be making recommendations for demonstration projects in the near future.

The Regional Municipality of Ottawa-Carleton is also active in TDM issues and has just completed a TDM study examining the potential of TDM measures to ease interprovincial travel in the National Capital Region. The Region has recently hired a TDM Coordinator to implement TDM activities in the region.

Transatlantic Collaboration

The Greater Toronto Area was selected in 1995 as one of eight primary regions in North America and Europe for participation in the Transatlantic Collaboration, which addresses shared objectives for improved transportation, land use and air quality, tailored for application in each local context. Under the sponsorship of the United States Centre for Clean Air Policy, the Collaboration is bringing together transportation and land use policy experts and practitioners to discuss their individual approaches and goals and consider a range of transportation, land use and clean air related policy initiatives, which would improve air quality and reduce greenhouse gas emissions.

By including a focus on options for transportation demand, this work complements other activities in the province which are addressing supply-side issues of transportation vehicles, infrastructure and fuels. The Collaboration will seek solutions that recognize the economic and social structure of the province and offer practical approaches to reduce or at least contain emissions in Canada's largest metropolitan area, which is expected to continue to be an area of rapid population growth.

The delegates and organizers of the first Policy Academy of the Collaborative met in Toronto in September, 1995, following an intensive working session in Portland, Maine. A second Policy Academy will be held in 1996, and the work of the Collaborative will be completed with an international policy symposium in 1997, when information and findings will be assessed and shared with other jurisdictions.

CCME Task Force on Cleaner Vehicles and Fuels

The Ontario government has been an active participant in the Task Force established by the Canadian Council of Ministers of the Environment (CCME) in November 1994 to seek improvements in air quality through strengthened standards for vehicle emissions and fuel formulations.

The Task Force recently completed its report, and its recommendations were endorsed by Environment ministers in October 1995. Initiatives include:

- a comprehensive approach to fuel efficiency improvements through changes in driver behaviour, on-road efficiency performance, purchase decisions and vehicle fuel efficiency technology;

- coordination of government and stakeholder activities to support the availability of advanced technology vehicles and market development of alternative fuels;
- the phase-in into Canada of the low emission vehicle initiative, planned for introduction in the U.S. 49 states;
- consideration of vehicle inspection and maintenance programs and other measures to help reduce in-use vehicle emissions; and
- new national standards for diesel and gasoline.

These initiatives will provide cross-cutting environmental benefits in Ontario by helping to reduce greenhouse gas emissions, as well as address the serious smog and ground-level ozone conditions in the province. The Ontario government and stakeholders will continue to participate in the design and implementation of these new standards.

The directions supported will set the stage for important progress in air quality and climate change on a national scale. Moving in harmony on air quality initiatives will ensure that the most cost-effective solutions are adopted to address shared North American environmental problems.

Round Table Transportation and Climate Change Collaborative

The Ontario Round Table on Environment and Economy, in partnership with the National Round Table, established a Transportation and Climate Change Collaborative to examine options for reducing greenhouse gas emissions in Ontario's transportation sector. The Collaborative was assisted by commissioned research and the participation of a multistakeholder panel.

The Collaborative brought together a diverse group of transportation stakeholders, to help develop a strategy for reducing transportation energy demand and related carbon dioxide emissions. Participants on the collaborative included: automobile and truck manufacturers, assemblers, parts suppliers and dealers; transit and railway operators; labour groups; municipalities and regional governments; alternative fuel producers; environmental groups; petroleum refiners; natural gas utilities; and a range of transportation, planning and economics experts.

Landfill Gas Recovery

The Ministry of Environment and Energy is considering environmental guidelines (under Regulation 347) for the management of landfill gas at larger new and expanded landfill sites. These guidelines will help to reduce methane emissions (as well as toxic contaminants) to the atmosphere and encourage the development of energy utilization projects.

Ontario has also committed to a provincial waste diversion target of 50% by the year 2000, which is expected to reduce overall methane emissions from landfills in Ontario.

The methane and other gases that are generated as organic wastes decompose in landfill sites and, if not controlled, can migrate off site where they can pose both environmental and health/safety risks. In addition, increasing concentrations of methane in the atmosphere are contributing to climate change. Ontario's landfills are estimated to produce 600,000 tonnes of methane annually.

The use of landfill liners and gas collection systems can capture a significant portion of the landfill gas in a modern engineered landfill facility. Once collected, the gas can be flared or used for energy production. This converts the methane into carbon dioxide, with a much lower global warming potential.

In Ontario, landfill gases are collected for flaring, or use in energy production, at eight landfill sites. Methane is being captured and flared off at six large Ontario landfill sites. It may also be collected and used as a heating fuel (landfill gas has about half the heating value of natural gas) or to generate electricity, as is done at the Brock West landfill, at the Keele Valley site, and soon will be undertaken at the Beare Road site by Metro Toronto. The three Metro Toronto landfills are estimated to recover about 90,000 tonnes of methane annually. A number of other facilities plan to capture fugitive methane emissions in the future.

Agriculture

The agriculture sector has opportunities not only to reduce emissions from operations through improved energy efficient technologies and expanded production and use of fuel ethanol, but also to decrease emissions from ruminant farm animals and to increase plant photosynthesis and carbon sequestration.

Measures to reduce greenhouse gas emissions that are currently being implemented by the agriculture industry in Ontario include the following: continued expansion and production and usage of fuel ethanol as a substitute for fossil fuels; reducing methane emissions from ruminant farm animals through improvements in feeding technology and increased use of feed additives which improve rumen efficiency; improving crop yields resulting in greater absorption of carbon dioxide through photosynthesis and enhanced carbon sequestering capacity in soil; and shifting to no-till seeding practices from conventional tillage practices reducing the rate of oxidation of soil organic matter, resulting in lower carbon dioxide emissions.

Farm Environmental Agenda

The Ontario Farm Environmental Coalition has developed and is delivering the environmental farm planning initiative with farmers. The Environmental Farm Plan initiative encourages farmers to conduct voluntary environmental farm assessments. To date 5,000 participants have attended local workshops, and approximately 1,500 approved and peer-reviewed plans have been received.

The Ontario Farm Environmental Coalition meets regularly with the Ontario Ministries of Agriculture, Food and Rural Affairs and Environment and Energy to discuss environmental issues and maintain a close working relationship.

Decreasing Methane Emissions

Methane emissions from respiration of livestock can be decreased in two ways, by increasing animal productivity, and by increasing digestion efficiency. Management practices to increase productivity have already been and will continue to be adopted by Ontario producers for economic reasons.

A second source of methane is from animal waste. Manure application methods are under constant review to determine how to maximize nutrient use, and reduce odour. This also reduces methane formation. Currently manure injection methods are being evaluated to determine if this technique could increase nutrient efficiency.

One project that is organized by OMAFRA is the "Custom Manure Applicators" course. The course focuses on environmental safety and nutrient efficiency in the context of manure application.

Research Program Area at the University of Guelph - Environment and Natural Resources

The Ontario Ministry of Agriculture, Food and Rural Affairs funds a portion of the research conducted by the University of Guelph's Environment and Natural Resources program area. This research focuses on air quality and trace gases management. The program seeks to develop sound management practices to minimize emissions that arise from agricultural sources. It also assesses the impact of nitrogen fertilization and water management strategies on the trace gas emissions from animal manure systems.

Dairy Sector Guide

The Ministry of Environment and Energy and the Ontario Dairy Council jointly prepared a "Guide to Resource Conservation and Cost Savings Opportunities in the Dairy Processing Sector", with support from the Ontario Ministry of Agriculture, Food and Rural Affairs, and Natural Resources Canada. This document, released in September 1995, was prepared to assist those who manufacture dairy products to identify process improvements to reduce production costs and conserve resources. By helping to find efficiencies in this important manufacturing sector in the province, energy will be conserved and greenhouse gas emissions minimized.

Forest Management

A number of recent initiatives introduced in Ontario to ensure forest sustainability through good forest management will also assist in responding to climate change by supporting carbon sequestration:

- Ontario recently proclaimed the **Crown Forests Sustainability Act** for the purpose of providing for the sustainability (long term health) of Crown forests. Managing forests to ensure their sustainability is the first priority.
- The Ontario Ministry of Natural Resources is entering into new business relationships with the forest industry to ensure regeneration of Crown forests. A **Forest Renewal Trust Fund** is in place to ensure adequate funds for forest renewal.
- Under the "**Private Forest Sustainability Program**", the Ontario Ministry of Natural Resources is promoting stewardship of private forest lands at the community level so as to assist woodlot owners in maintaining their woodlands.

V. MEETING THE CHALLENGE

Many initiatives are well under way in Ontario that will help address climate change. Others are in varying stages of development. The province is participating in a number of collaborative exercises and studies that will assist in delineating further opportunities to reduce greenhouse gases.

The Ontario government looks forward to further progress on air issues through continued collaboration with other governments, and with the province's industry and environmental stakeholders who have signalled their commitment to work closely with government in designing and implementing future initiatives to assist in meeting the challenge posed by climate change.

With these initiatives, and with active participation in the Voluntary Challenge and Registry Program, progress will be made in Ontario in support of the national climate change objectives.

